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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/570,050
Filing Date: February 27, 2006
Appellant(s): FAN, YIPING

Robert J. Crawford
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/20/2010 appealing from the Office action mailed 4/22/2010.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal..

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,920,119	Jeanjean et al	10-2005
6,920,471	Chan et al	07-2005
6,678,511	Hwang et al	01-2004

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior arts are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, 4-6, 9-12, 14-18, 21 and 24-25 are rejected under 35 USC 103 (a) as being unpatentable over Hwang et al (US 6,678,511).

Regarding claims 1 and 11, Hwang et al discloses in Figures 1-9 a filter circuit comprising:

- at least two cascading filters of different orders including a second filter (12 in Figure 7) being coupled to a main filter (20 in Figure 7) and having pass-band ripples with respect to signal gain of the respective filter at frequencies in a pass-band of the respective filter and nearly

equal in magnitude and out of phase with respect to each other in order to minimize a pass-band ripple in the composite filter, see Figure 3. Wherein the number of stages of the main filter (20) is nine and the number of stages of the second filter (12) is increased or decreased according to the performance of the main filter (20) in the system, preferably selected in even stages such as two or four stages, see lines 64-65 column 4 and lines 5-25, column 5. Thus, the orders of the main filter (20) is higher than the orders of the second filter (12) at least by one since the main filter (20) has more stages than the second filter (12). In particular, if the number of stages of the second filter (12) is selected to eight stages, then the difference of orders between the main filter (20) and the second filter (12) would be exactly in a value of one as claimed.

Regarding claims 2 and 12, wherein the magnitude of the pass-band ripples in the at least two cascading filters (12, 20) are equal.

Regarding claims 4 and 14, wherein at least one of the at least two cascading filters (12, 20) comprises an analog filter.

Regarding claims 5 and 15, wherein at least one characteristic of the at least two cascading filters (12, 20) is selectable to minimize the pass-band ripple in the composite filter.

Regarding claims 6 and 16, wherein the at least one characteristic comprises the orders of the at least two cascading filters (12, 20), see lines 5-25 of column 5.

Regarding claims 9 and 19, wherein the at least one characteristic comprises a bandwidth of the at least two cascading filters (12, 20), see Figures 1-3.

Regarding claim 10, wherein the filter (20) is the band pass filter so that it comprises a stop-band attenuation of the at least two cascading filters (10, 20), see Figure 6c.

Hwang et al discloses the filter circuit with all limitations of the claimed invention as stated above but fails to suggest that "the orders of the two cascading filters (10, 20) differ in value by exactly one" as called for in claims 1 and 11, "one filter of the two cascading filters (10, 20) is a third order while another filter is the fourth order" as called for in claim 21, and "the combined ripples of the two cascading filters (10, 20) are less than .01dB at around 7.8 MHZ" as called for in claim 24.

Although Hwang et al. does not specify that the different value between the orders of the main filter (20) and the second filter (12) in a value of exactly one as claimed; however, Hwang et al discloses on lines 5-9, column 5, that the second filter (12) can be implemented in any number of stages and the number of stages (the orders) of the second filter (12) can be increased or decreased according to the performance of the main filter (20) and the repeater system. Thus, Hwang clearly suggests that the orders of the second filter (12) is determined based on the ripples of the main filter (20). Since the filter of Hwang can be used in different systems, selecting the optimum orders for the second filters (12) of Hwang et al to acheive the optimum different value between the orders of the filters (12, 20) in a value by exactly one as claimed is considered to be a matter of an electrical design expedient for an engineer depending upon the particular application or the particular system in which the filter circuit of Hwang et al is to be used. It would have been obvious to a person having skill in the art at the time the invention was made to select the optimum orders for the second filters (12) of Hwang as claimed for the

purpose of optimizing the cancellation of ripples in the main filter (20) to provide the desired flattened pass-band ripple required by a predetermined system.

Regarding claims 21 and 24, although Hwang et al fails to suggest that the orders of the first and second filters (12, 20) are the third and fourth orders as called for in claim 21, and the combined frequency response of the cascaded filters (12, 20) has a peak ripple less than about .1 dB at 7.8 MHZ as called for in claim 24; however, a skilled artisan realizes that the bandwidth of the cascaded filter (12, 20) is determined by the orders which are selectable, and the cascaded filters (12, 20) of Hwang et al can be modified to operate at the frequency of 7.SMHZ by selecting the value of their components. The magnitude of the combined ripple of the cascaded filters (12, 20) of Hwang et al also can be achieved about .01 dB at frequency 7.SMHZ by carefully adjusting the complementary ripples of the second filter (12). Thus, selecting the optimum orders and the optimum operating frequency for the modified filter circuit of Hwang et al in order to accommodate with the requirement of a predetermined system in which the modified filter circuit of Hwang et al is to be used is considered to be a matter of an electrical design expedient for an engineer. It would have been obvious to a person having skill in the art at the time the invention was made to select the optimum orders for the second filter (12) and the optimum values for the components of the modified filer circuit of Hwang et al. and carefully adjusting the combined ripples of the modified cascaded filters (12, 20) for the purpose of providing a desired bandwidth, desired operating frequency and desired flattened pass-band ripples to accommodate with the requirement of a predetermined system.

Claims 3, 13 and 22-23 are further rejected under 35 USC 103 (a) as being unpatentable over Hwang et al (US 6,678,5110) in view of Chan et al (US 6,920,471).

Hwang et al discloses a filter circuit with all of the limitations of the claimed invention as stated above but does not disclose that at least one of the at least two cascading filters comprises a digital filter such as a finite response filter.

Nevertheless, Chan et. al suggests in Figure 3 that the digital filter (100) can be used to combine with the analog filter (12) for the purpose of compensating for absolute sampling and digital delays associated with the matching circuit. See the Abstract.

It would have been obvious to a person having skill in the art at the time the invention was made to employ a digital filter in the circuit of Hwang as suggested by Chan et al by replacing the second filter (12) of Hwang et al with an equivalent digital filter for the purpose of compensating for the absolute sampling and digital delays associated with a matching circuit of the filters.

Also, as well known in the art, the digital filter such as IIR and FIR and the analog filter are the types of filter. They perform the same function by removing unwanted signals or noise with the exception of that the digital filter handles digital input signal and can be tuned with the digital input signal while the analog filter handles the analog input signal. Thus, employing the digital filter in the modified circuit of Hwang et al to handle the digital input signal and allow digitally tuning is considered to be an electrical design expedient for an engineer for an engineer depending on an a particular application that would have been obvious at the time of the invention.

Claims 1-2, 4-6, 9, 11-12, 14-16, 18, 21 and 24 are rejected under 35 USC 103 (a) as being unpatentable over Jeanjean et al (US 6,954,119) in view of Hwang et al (US 6,678,511).

Regarding claims 1 and 11, Jeanjean et al discloses in Figure 3 a filter circuit comprising:

- at least two cascading filters of different orders including a third order filter (21) being coupled to a second order filter (20); and

- wherein the orders of these filters (20, 21) differ in value by exactly one.

Regarding claims 4 and 14, wherein at least one of the at least two cascading filters (20,21) comprises an analog filter.

However, Jeanjean et al fails to suggest that the passband ripples of the second order filter are the counter-ripples corresponding to the ripples of the first filter and these ripples of the filters (20, 21) are nearly equal in magnitude and out of phase with respect to each other in order to minimize a pass-band ripple in the composite filter.

Nevertheless, Hwang et al suggests in Figures 1-7 to employ the second filter (12) having the counter-ripples and place this filter after the main filter (20) for providing a flatted passband ripples for the cascaded filter that would correct the distortion in the pass band of the main filter, see lines 5-15, column and lines 1-25 of column 5.

It would have been obvious to a person having skill in the art at the time the invention was made to incorporate the suggestion of the counter- ripples suggested by Hwang et al into the circuit of Jeanjean et as for the purpose of correcting the distortion in the pass-band of the filter.

Regarding claims 21 and 24, although Jeanjean et al in view of Hwang et al fails to suggest that the orders of the first and second filters are the third and fourth orders as called for in claim 21, and the combined frequency response of the cascaded filters has a peak ripple less than about .1 dB at 7.8 MHZ as called for in claim 24; however, a skilled artisan realizes that the bandwidth of the cascaded filter is determined by the orders which are selectable, and the cascaded filters of Jeanjean et al can be modified to operate at the frequency of 7.SMHZ by selecting the value of their components. The magnitude of the combined ripple of the cascaded filters of Jeanjean et al also can be achieved about .01 dB at frequency 7.SMHZ by carefully adjusting the complementary ripples of the second filter. Thus, selecting the optimum orders and the optimum operating frequency for the modified filter circuit of Jeanjean et al in order to accommodate with the requirement of a predetermined system in which the modified filter circuit of Jeanjean et al is to be used is considered to be a matter of an electrical design expedient for an engineer. It would have been obvious to a person having skill in the art at the time the invention was made to select the optimum orders for the second filter and the optimum values for the components of the modified filer circuit of Jeanjean et al., and carefully adjusting the combined ripples of the modified cascaded filters for the purpose of providing a desired bandwidth, desired operating frequency and desired flattened pass-band ripples to accommodate with the requirement of a predetermined system.

Regarding claims 2, 5-6, 9, 12, 15, 16 and 18, wherein the magnitude of the pass-band ripples in the at least two cascading filters (20, 21) of the modified circuit of Jeanjean et al would be equal.

(10) Response to Arguments

a). The Appellant argues in page 5 of the Brief that the rejections are improper because the Examiner's suggested optimization requires a skilled artisan to try an infinite number of possible filter orders without providing any direction as to which of the many possible choices is likely to be successful. The Hwang et al. reference does not provide any direction as to which of the infinite number of filter order combinations is likely to be successful. The Examiner has not provided evidence that suggests that experimentation with such ripple characteristics would lead the skilled artisan to filters differing by exactly one.

These arguments are not persuasive because Hwang et al evidently suggests the direction to achieve the flatness of ripples in the pass band of the cascaded filters (12, 20) by clearly disclosing on lines 5-25 of column 5 that the number of stages of the second filter (12) would be increased or decreased according to the performance (ripples) of the main filter (20). Thus, increasing the optimum orders of the second filter (12) to provide an optimum value of the orders difference between the orders of the filters (12, 20) by exactly one as claimed is suggested by Hwang et al. and is considered to be the matter of the design expedient for an engineer that would have been obvious at the time of the invention.

b). The Appellant argues in pages 6-7 of the Brief that increasing the order of the filters as "a matter of electrical design" further ignores technical challenges faced in the area of filter

design. It is self evident that increasing the filter order requires additional circuitry, which increases the expense of both design and production. Accordingly, there is no motivation for the skilled artisan to modify the Hwang et al reference in the manner proposed by the Examiner.

These arguments are not persuasive because the arguments are based on the limitations that are not recited in the rejected claims. There is nothing recited in the rejected claims about the cost of the design and the production of the filter circuit. The examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, Hwang et al discloses a cascaded filter circuit comprising the second filter (12) coupled in series with the main filter (20) and suggests to employ the complementary ripples of the second filter (12) for canceling the ripples of the main filter (12) by selectively increasing or decreasing the orders of the second filter (12). Thus, selecting the optimum orders for the second filters (12) of Hwang et al to have the optimum different value between the orders of the filters (12, 20) by exactly one as claimed would have been obvious to a person having skill in the art at the time of the invention.

c). The Appellant argues in page 12 of the Brief that the combination of the Jeanjean reference as modified by the Hwang et al reference is insufficient to establish a sustainable rejection, because the proposed modification is contrary to the central teachings of the Jeanjean et al . In particular, Jeanjean directs towards the approximation of a high order filter using two or

more carefully selected lower order filters having specific relationships. The Examiner's proposal would abandon these specific relationships to result in a filter that does not approximate a higher order filter behavior. The Examiner's conclusions are improper because they fail to recognize or consider the differences between a complimentary band pass filter and a more-traditional band pass filter. Accordingly, the Examiner's apparent suggestion to modify the filter of Jeanjean et al then incorporated this aspect into the Hwang et al., using the claimed invention as a template. This is the hallmark of improper hindsight reconstruction with the proposed combination being derived, not "on the basis of the facts gleaned from the prior art," but solely from Applicant's disclosure.

These arguments are not persuasive because the following reasons:

- The cascaded filter circuit of Jeanjean et al has the same structure as the claimed circuit in which the cascaded filter requires two filters connected in series and have the orders difference in a value by exactly one.

- Hwang et al clearly suggests to correct the distortion of the pass-band of the filter circuit by employing the complementary ripples of the second filter to cancel the ripples of the main filter. Thus, modifying the circuit of Jeanjean et al by the suggestion of Hwang et al is not improper hindsight reconstruction or in contrary to the central teachings of the Jeanjean et al. The modified filter circuit of Jeanjean et al in view of Hwang et al would flatten the ripples in the pass band of the filter and still keeps the higher order behavior since it comprise two filters in cascaded. Also, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only

knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

d). The Appellant argues in page 16 of the Brief that the filter order is not directly-related to the bandwidth of the filter. Therefore, the order of the filters is not a result-effective variable of bandwidth.

This argument is not persuasive because, as was well known in the art, increasing the orders of the filter would increase the components of the filters so that the bandwidth of the filter would be widened. See how the bandwidth being increased in the reference of Tan et al (U.S. 6,011,770).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

(12) Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DINH T. LE whose telephone number is 571-272-1745. The examiner can normally be reached on Monday-Friday (8AM-7PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lincoln Donovancan be reached on (571) 272-1988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent (Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/DINH T. LE/

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